



# Social Anxiety in Digital Learning Environments: Empirical Evidence and Call to Action

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It is internationally accepted that digitally-supported learning increases the accessibility of higher education due to its capacity to overcome traditional university's spatial and temporal limitations. At the same time, increased student-teacher ratios and reduced student-targeted support may lower the quality of learning and instruction in higher education. Research focussed on digital learning environments in higher education identified social anxiety as an increased challenge for learners and teaching staff. This international case study investigates students' social anxiety at two higher education institutions. Findings show that social anxiety exists in higher education digital learning environments and differs across cultural contexts and gender. The data suggests that it is worth tertiary educators pausing to consider the role that social anxiety may be playing in reducing interactions within online units. Additional research is required to establish the causes of social anxiety in digital learning environments and develop strategies to minimise its effect.

Keywords: Social anxiety; digital learning environment; higher education

## Introduction

Digital learning environments are widely used especially in higher education and in this way, learners are provided with learning opportunities that are independent of time and space. Digitally-supported learning is defined as any set of technology-based methods that can be applied to support student learning and instruction (Wheeler, 2012). Research has shown that digitally-supported learning increases the accessibility of tertiary education due to its capacity to overcome the spatial and temporal limitations of traditional teaching settings (Bates, 2005; Braun, 2008). Open access to higher education (Greenland & Moore, 2014) and different modes of distance learning (Bailey et al., 2018; Bailey et al., 2015; Cohen, 2003) have thus become critical long-term strategies for international universities to encourage higher education participation (Allen & Seaman, 2006; Ziguras & McBurnie, 2011).

However, a recent report from OECD (2021) emphasised that increased student-teacher ratios and reduced student-targeted support may lower the quality of learning and instruction in higher education, leading to greater dropout rates, especially among disadvantaged students. Further, research focused on digital learning environments identified various challenges for learners, such as technical problems, lack of community, motivation, self-regulation, self-efficacy, or social anxiety (Armellini et al., 2021). Such barriers may limit the opportunities of digital learning environments for supporting learning and teaching (Hill et al., 2009; Muilenburg & Berge, 2005). Hence, social anxiety, an emotional disorder that is often unnoticed or masked by the casual observer, is one psychosocial aspect that may impede achievement in higher education (Brook & Willoughby, 2015). Research findings support the assumption that there are differences among learners with different levels of social anxiety, both in face-to-face and digital learning environments (Grieve et al., 2017).

This paper reports on an international case study comparing students' social anxiety at two higher education institutions located in Australia and Germany. Particularly, the research team utilised a standardised instrument

at both higher education institutions which provides insights into perceptions of students' social anxiety among peers as well as concerning teaching staff.

## Background

### Social anxiety

Through digital learning environments, learners interact with learning materials and related assessments as well as with peers or tutors and instructors. The various interaction types are central to enhancing the learning experience and learning processes as well as performance (Garrison & Cleveland-Innes, 2005). From a social constructivist perspective (Cole et al., 1978; Woo & Reeves, 2007), the interaction with peers and tutors or instructors facilitates the critical reflection of processed information and helps to elaborate the conceptual understanding of the phenomenon in question. In addition, Tinto (2005) suggested that engagement and integration in the social environment of the higher education community are critical predictors of student persistence, retention, and study success (Tinto, 2017). However, thinking about engaging or interacting with peers and teaching staff may exacerbate the social worries that are at the heart of social anxiety, making it difficult to participate in class, join in conversations, or seek help to navigate the higher education environment successfully (Brook & Willoughby, 2015).

Social anxiety is defined as a persistent fear of embarrassment or negative evaluation while engaged in social interaction or public performance (Heimberg et al., 1999). Anxiety, depression, and uncomfortable feelings are symptoms of social anxiety (Pierce, 2009). Social anxiety is triggered by some situations such as early experience, social fear, fear of negative evaluation, social avoidance, social stress, self-depreciation, and positive anticipation (Hofmann et al., 2010; Shepherd & Edelman, 2005; Weidman et al., 2012). In the context of digital learning environments, social anxiety is regarded as an individual disposition that affects the interaction with the digital system (Agarwal & Karahanna, 2000). Individuals feel more comfortable in online communication (Lee & Stapinski, 2012; Shepherd & Edelman, 2005) through anonymity and deindividuation potential of the environment (Weidman et al., 2012). Grieve et al. (2017) have found that individuals who demonstrate a high level of social anxiety tend to interact more through online systems rather than via face-to-face interaction. However, interaction in digital education is not generally anonymous so this may not be the case with most digital learning environments. In addition, social norms, embarrassment, self-construal, gender role and gender role identification have been identified as variables that affect individuals' social anxiety states (Hofmann et al., 2010; Jefferies & Ungar, 2020). Further findings indicate that the individual's level of social anxiety is differing according to their country of origin, i.e., cultural background and contexts (Zhong et al., 2007). Further, Weinstein et al. (2015) show that gender differences in social anxiety are related to cultural expectations. However, research seems limited concerning social anxiety in digital learning environments from an international perspective. Closing this research gap is regarded as highly relevant concerning heterogeneous student groups and digital learning environments being available for students from different countries (Loizzo & Ertmer, 2016).

### Current study

The aim of this international case study is a comparative investigation of students' self-reported social anxiety focussed on higher education digital learning environments. Given previous research findings (Zhong et al., 2007), it is hypothesised that students' social anxiety in higher education digital learning environments differs based on their country of origin, i.e., Australia or Germany for learner-learner interactions (Hypothesis 1a) and learner-instructor interactions (Hypothesis 1b). Following previous related findings focussing on gender differences related to social anxiety (Weinstein et al., 2015), we assume that students' social anxiety in higher education digital learning environments differs among gender for learner-learner interactions (Hypothesis 2a) and learner-instructor interactions (Hypothesis 2b).

## Method

### Participants, context and design

The study utilised a non-representative convenience sample with participants enrolled in higher education institutions from Australia and Germany. The study was conducted by two of the co-authors of this paper as self-report online survey research at their respective higher education institutions. Participants included  $N = 295$  (75% female and 25% male) undergraduate and graduate students from Australia ( $N_{Aus} = 155$ ) and Germany ( $N_{Ger} = 140$ ). Both student cohorts were studying in the broader context of education, while Australian

participants were enrolled in child development and creative technologies and German participants in the area of economic and business education. The average age of participants was 24.56 years ( $SD=7.32$ ). Ethics approval was obtained for this research and the relevant protocols were followed.

### Instrument and analysis

The Social Anxiety Scale (SASE) for digital learning environments (Keskin et al., 2020) consists of two sub-scales and 46 items. The first sub-scale focuses on Learner-Learner interactions (23 items) and the second sub-scale focuses on Learner-Instructor interactions (23 items). Each sub-scale consists of three dimensions such as negative evaluation (9 items), somatic symptoms (4 items), and avoidance of interaction (10 items). The SASE uses a seven-point Likert scale (1 = strongly disagree to 7 = strongly agree). Cronbach's Alpha reliability coefficient for the two sub-scales was calculated as 0.96 for Learner-Learner and 0.97 for Learner Instructor. Further data collected included students' demographic information such as age, gender, and study course. After combining the data sets from the two countries and a standard data pre-processing, the hypotheses were tested with adequate descriptive and inferential tests. All effects were tested at the .05 significance level.

### Results

Independent-samples t-tests were conducted for testing hypotheses 1a and 1b. Regarding hypothesis 1a, there was a significant difference of social anxiety for learner-learner interactions between Australian students ( $M_{AUS} = 77.96$ ;  $SD_{AUS} = 19.30$ ) and German students ( $M_{GER} = 69.88.64$ ;  $SD_{GER} = 22.56$ ),  $t(293) = 2.941$ ,  $p = .004$ ,  $d = .029$ . Regarding hypothesis 1b, no statistically significant difference was found for social anxiety for learner-instructor interactions between Australian students ( $M_{AUS} = 71.48$ ;  $SD_{AUS} = 23.25$ ) and German students ( $M_{GER} = 67.42$ ;  $SD_{GER} = 24.38$ ). Accordingly, the findings suggest that Australian students have higher social anxiety when interacting with peers in higher education digital learning environments.

Concerning hypotheses 2a and 2b, independent-samples t-tests were conducted. Regarding hypothesis 2a, there was a significant difference of social anxiety for learner-learner interaction between female students ( $M_F = 76.39$ ;  $SD_F = 21.36$ ) and male students ( $M_M = 67.49$ ;  $SD_M = 19.65$ ),  $t(293) = 3.271$ ,  $p = .001$ ,  $d = .036$ . Regarding hypothesis 2b, there was a significant difference of social anxiety for learner-instructor interaction between female students ( $M_F = 71.53$ ;  $SD_F = 23.77$ ) and male students ( $M_M = 63.77$ ;  $SD_M = 23.24$ ),  $t(293) = 2.551$ ,  $p = .011$ ,  $d = .022$ . Accordingly, the findings suggest that female students have higher social anxiety when interacting with peers and teaching staff in higher education digital learning environments.

For post-hoc analyses, a new variable was created by combining gender and country. The new groups include Australian-Female (AF), Australian-Male (AM), German-Female (GF), and German-Male (GM). One-way ANOVA was conducted to determine the differences between the groups ( $F(3, 291) = 6.164$ ,  $p = .000$ ,  $\eta^2 = .059$ ). There was a significant difference in social anxiety for learner-learner interaction between the groups. Tukey-HSD test was conducted to determine the source of the differences. Significant differences of social anxiety were found between AF ( $M = 79.66$ ;  $SD = 19.10$ ) group and GM ( $M = 66.13$ ;  $SD = 20.32$ ) for the learner-learner interaction. No further statistically significant differences in social anxiety for learner-instructor interaction were found.

### Discussion and conclusion

Mass higher education has become a reality across continents and led to substantial growth in the number of countries with universal access to higher education, and great diversification of an international student body (Teixeira & Shin, 2020). While higher education digital learning environments offer more freedom for individual learning, they also require increased personal responsibility, both from the learner and from the teaching staff.

Our findings support the assumption that social anxiety exists in higher education digital learning environments (Mullenburg & Berge, 2005). More specifically, the cultural context appears to be a significant driver of social anxiety within the peer interaction (Zhong et al., 2007). Interestingly, our findings did not identify cultural differences in social anxiety for learning-instructor interactions. As higher education institutions move toward more online delivery our findings suggest that a pause to consider the impact that social anxiety may be having on students is appropriate. Students participating in digital education are not anonymous to staff or to other students in the unit being studied (Giacumo & Savenye, 2020). This means that interactions within common elements of online courses such as discussion boards, or other online tools through which students contribute responses visible to staff and/or peers, may be producing social anxiety at a level that impedes participation and hence lowers the educational effectiveness of these tools. Higher education teaching staff often lament the lack

of interaction in online units and an often overlooked factor in this may well be social anxiety levels (Beuchota & Bullen, 2005). The question of how to better design online learning to encourage maximum participation while minimising anxiety requires further investigation if higher education institutions are to optimise the digital learning experience for students. If nothing else, as individual educators, it is important to reflect on the online courses being taught, the characteristics (e.g., culture, gender, age) of students within them, and the potential for our pedagogical strategies to cause social anxiety unintentionally. This may be especially the case within a social-constructivist paradigm where activities that encourage communication and cooperation are being embedded within online units.

Despite the findings reported, this international case study is not without limitations. These findings may not apply to the general population as they were based on two convenience samples. Expanding the data from both institutions through purposive sampling could further enhance the representativeness of obtained findings for the local contexts. Further, the self-report data may be biased as individuals tend to have different answers when they report their own experiences. Through a mixed-methods design, qualitative data might produce more detailed descriptive insights into individual dispositions linked to social anxiety in digital learning environments. Therefore, our current research expands to samples from additional countries and adds a qualitative investigation focussing on students and teaching staff concerning their perceptions of social anxiety and what pedagogical practices they are familiar with. Looking ahead, higher education institutions may further embrace and utilise the well-documented advances of learning analytics, such as personalisation of learning and interaction opportunities as well as adaptation toward individual dispositions of students (Bennett & Folley, 2021; Feng et al., 2021; Gašević et al., 2019), to overcome the challenges related to social anxiety in digital learning environments.

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